

**Course:** *MRI of Professional Athletes*

**Talk Title:** *Shoulder*

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Shoulder pain in professional athletes is a common problem particularly in overhead throwing athletes such as baseball pitchers. It has been estimated that up to half of professional baseball pitchers have some type of shoulder pain/injury during a season. Shoulder injuries in overhead throwers often affect multiple structures including the rotator cuff labrum and capsule. The dreaded “dead arm syndrome” refers to any pathologic shoulder condition in which the thrower is unable to throw with pre-injury velocity and control because of pain and subjective unease of the shoulder. During the pitching motion the shoulder is subjected to forces that reach the failure point of its supporting structures. The shoulder rotates at an angular velocity of 7000 degrees per second, and experiences distractive forces of 950 Newtons and posterior shear forces of 400 Newtons. Despite a large amount of research, the exact etiology of the shoulder pathology remains controversial.

Anterior Laxity/Instability was first proposed in the late 1980’s and was postulated to be secondary to repetitive stretching of the anterior capsuloligamentous complex from the throwing motion. This anterior capsular stretching was postulated to lead to anterosuperior migration of the humeral head leading to secondary subacromial impingement. Treatment entailed anterior capsular reconstruction but only 50-68% of patients were able to return to their previous level of pitching.

The second theory to explain overhead throwers shoulder pathology was that of internal impingement. First described in 1992 by Walch, this theory attributes pathology to impingement between the posterior superior border of the glenoid and the undersurface of the tendinous insertions of the supraspinatus and infraspinatus. Although this “internal impingement” is most likely physiologic and occurs in all people during external rotation and abduction, it is felt to be a problem in overhead throwers because of its repetitive occurrence.

The third major theory to explain shoulder pathology in overhead throwers is an acquired posteroinferior capsular contracture and was advanced by Burkhardt. The posterior contracture is felt to begin a pathologic cascade with loss of internal rotation, shift in the glenohumeral contact point posterosuperiorly, increased external rotation, increased forces at the biceps anchor and posterior superior labrum leading to SLAP tears and finally increased stress in the posterosuperior rotator cuff leading to undersurface tearing.

Each of these theories will be discussed in detail in this lecture. This lecture will benefit both those involved with taking care of overhead athletes with shoulder pain as well as those imaging the overhead athlete with shoulder pain. It will enable them to identify key imaging findings consistent with the various types of shoulder pathology seen in overhead athletes as well as understanding the major theories explaining the etiology of these injuries.

**References:**

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